

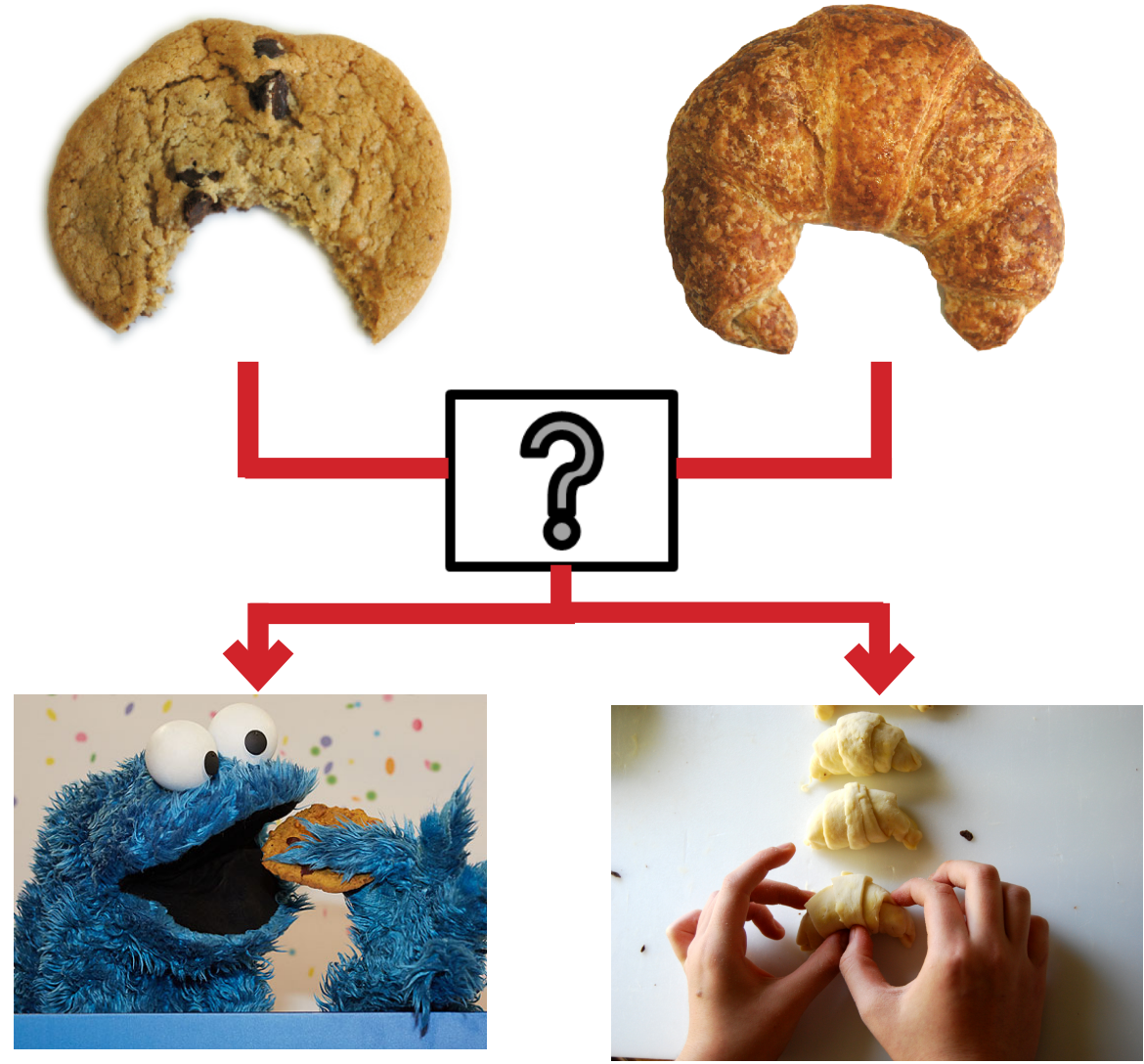
# Representing shapes from a generative model perspective

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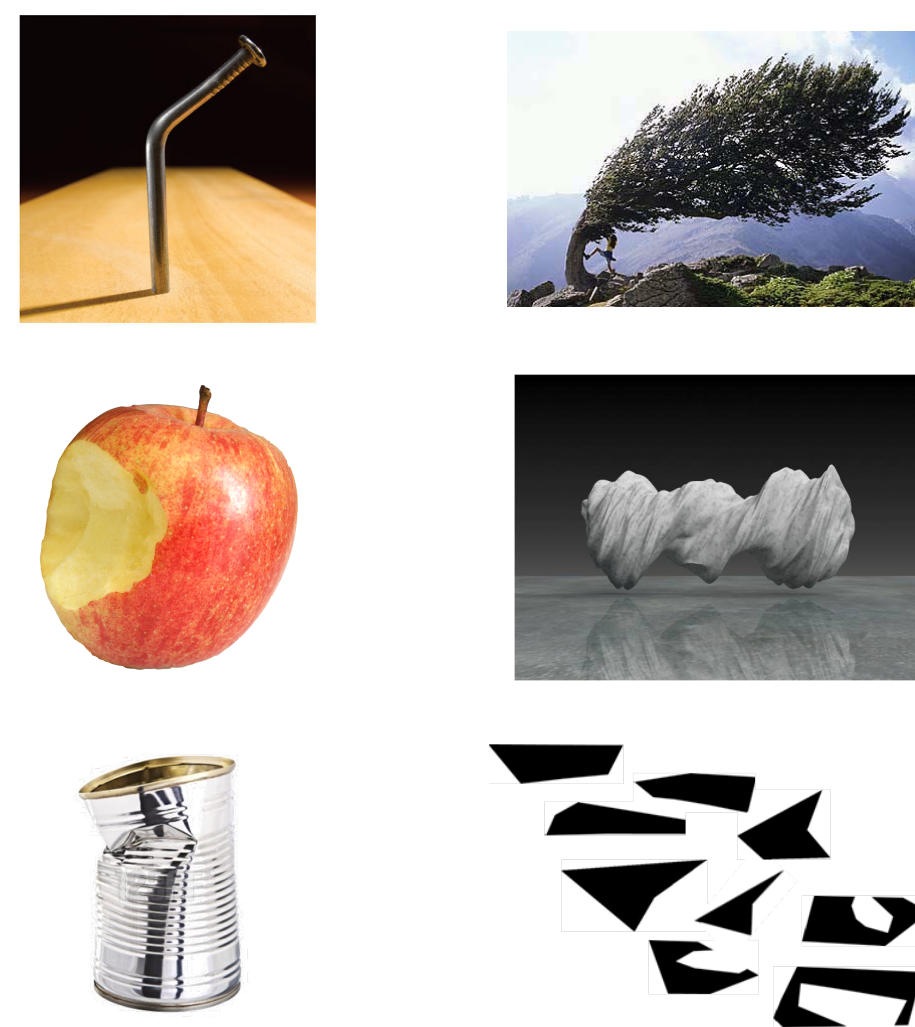


## Background

### Inferring causal origin



### Perceiving shapes as transformed

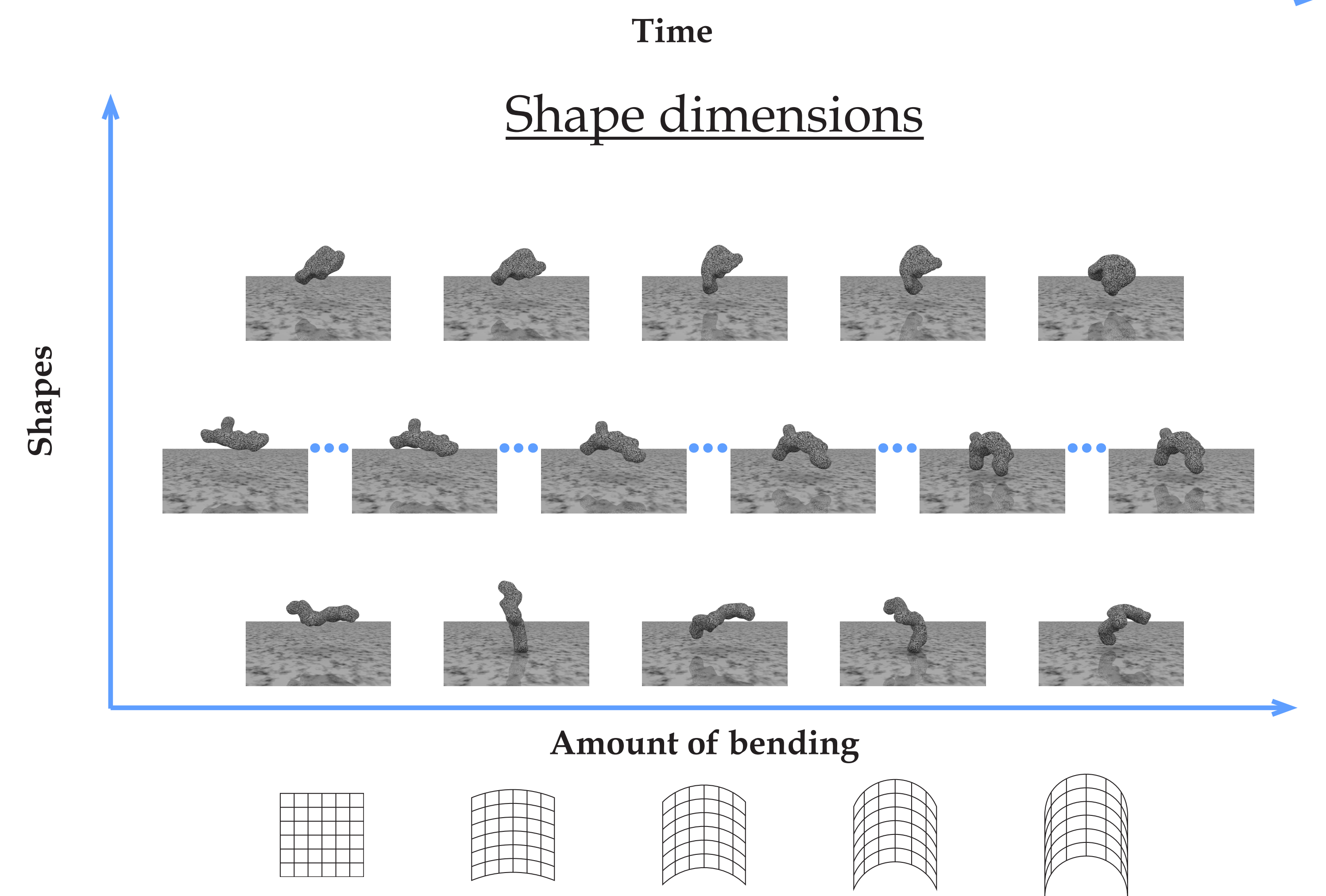
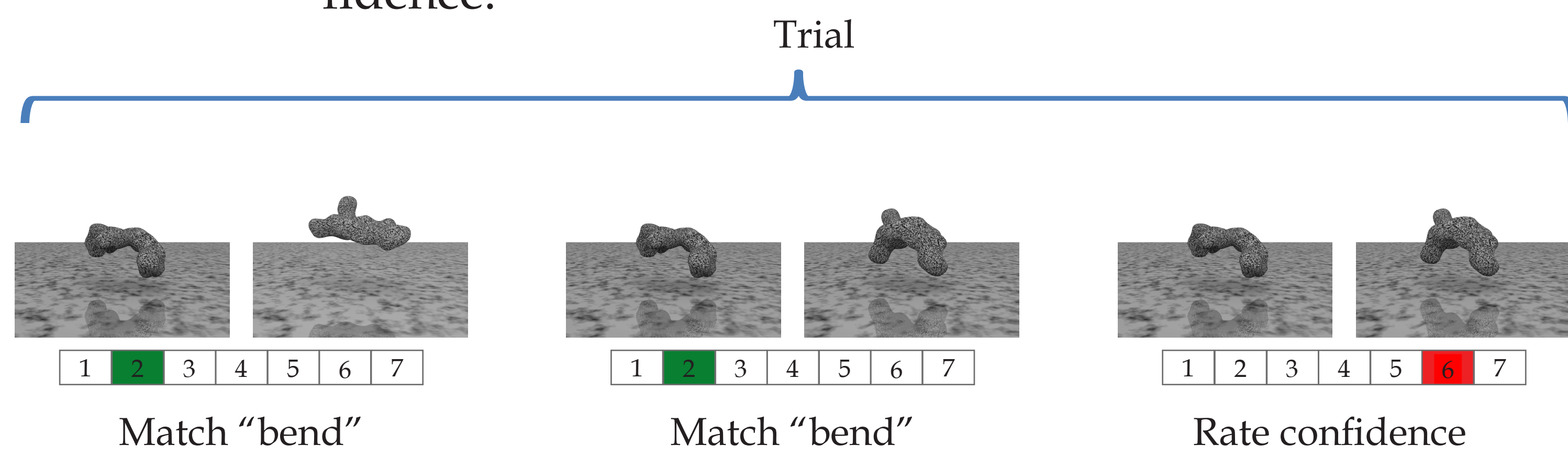
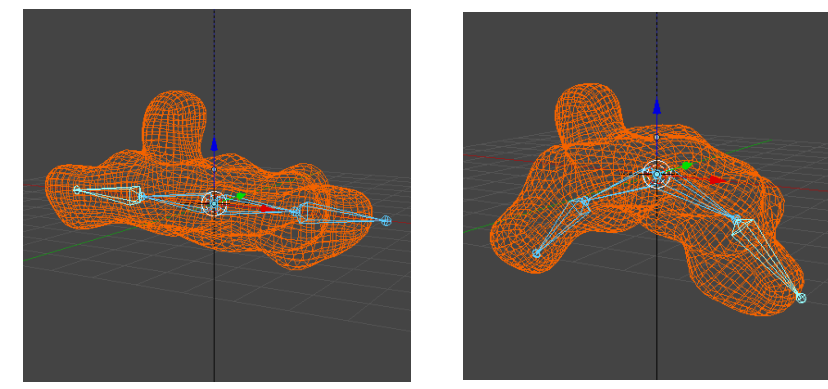


## Asymmetric Matching Task

**Question:** To what extent can subjects separate causal contributions to shape?

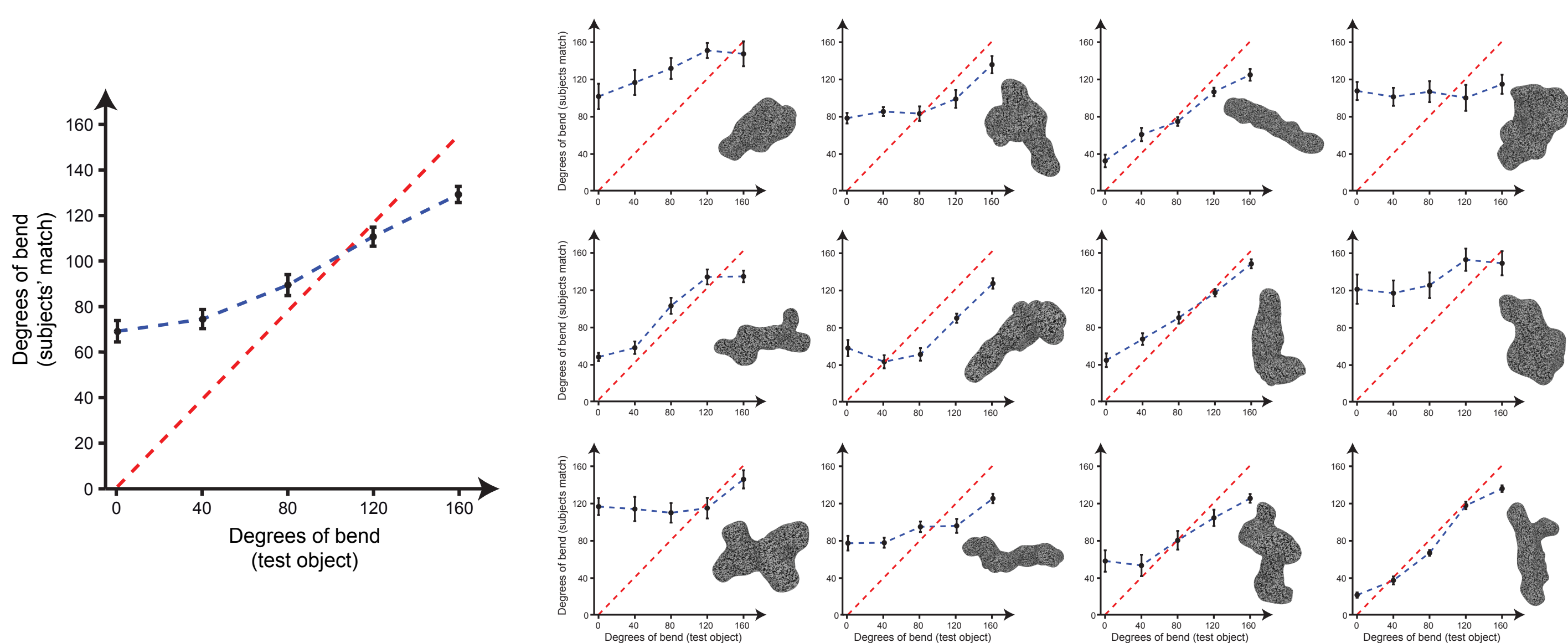
**Shapes:** Degree of bending, Orientation

**Task:** Make the match shape as "bent" as the test shape (while ignoring any other difference in shape) & rate your confidence.



## Results (Matching task)

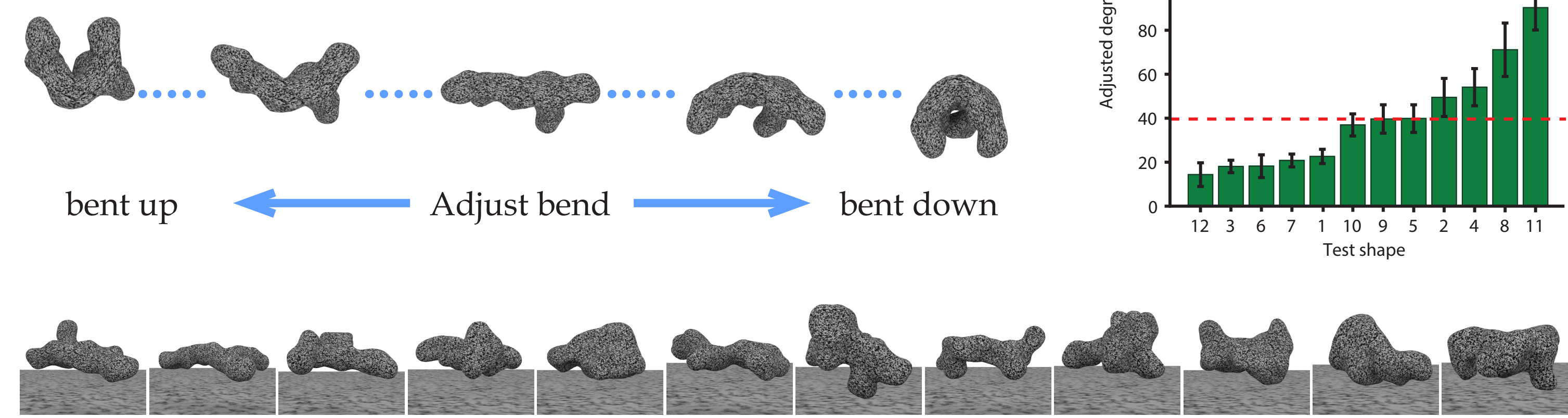
### Subjects extract transformations



## Nulling Task

**Question:** What bend configuration do subjects perceive as neutral (not bent)?

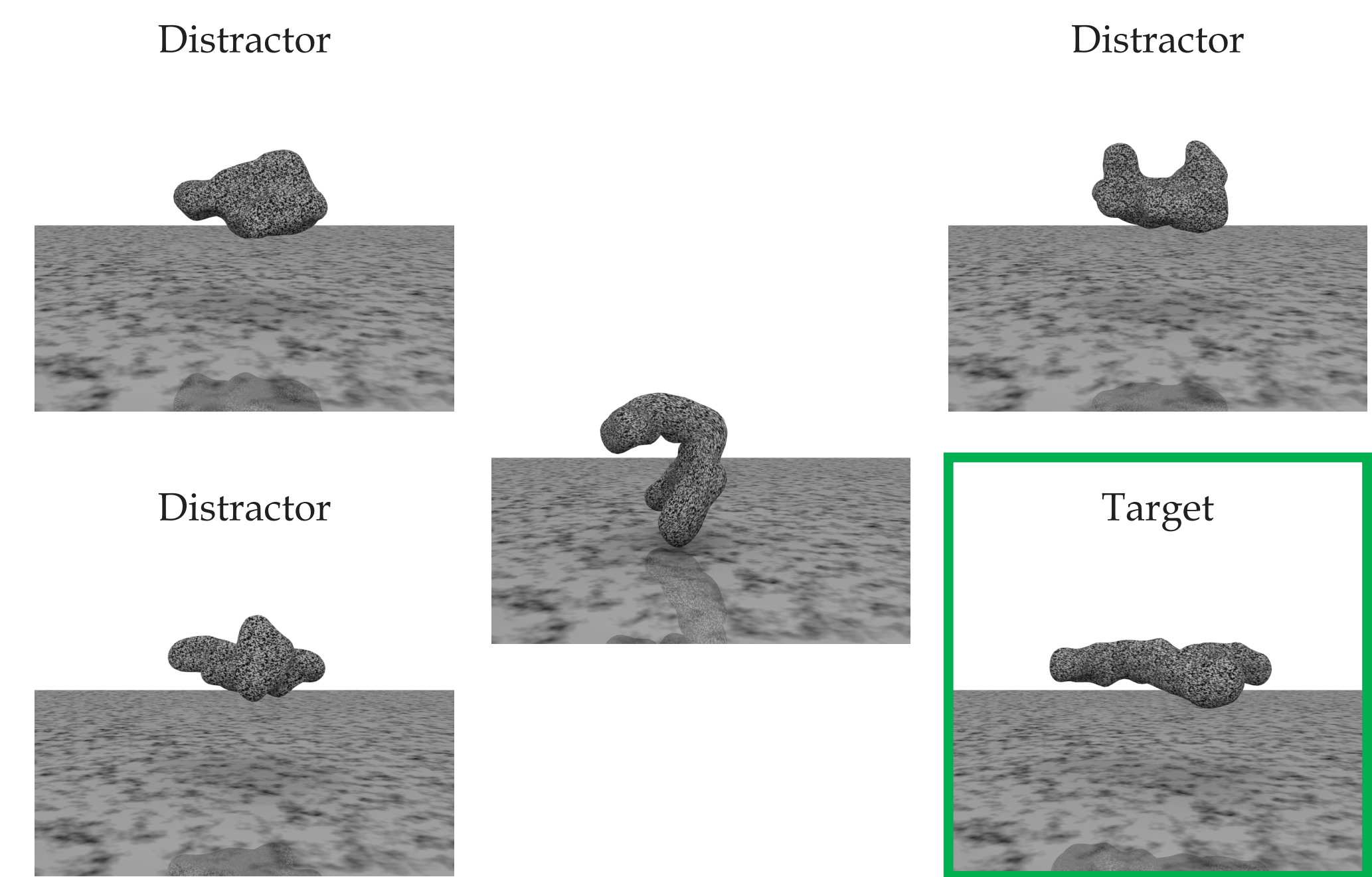
**Task:** Adjust the shape until it appears 'not bent' to you!



## Identification Task

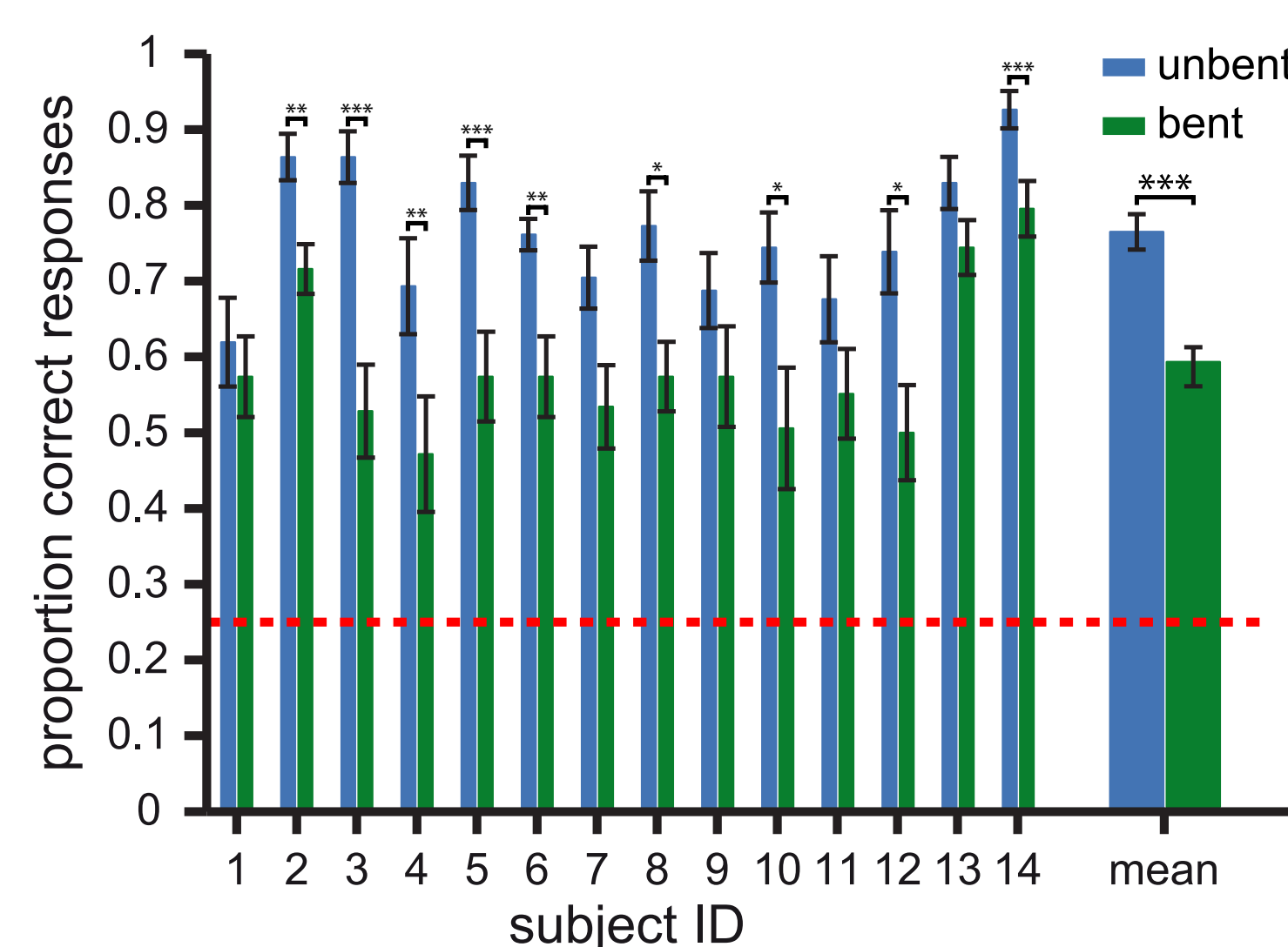
**Question:** Can subjects discount the transformation?

**Task:** Choose untransformed version of test shape (center) from set of 4 untransformed shapes (surround)



## Results (Identification task)

### Subjects can discount transformations



- Subjects performed significantly above chance (red dashed line)
- unbent was easier than bent object
- Additional cost to undo transformation
- Correct through a process of elimination

## General Conclusion & Discussion

Generative models play a crucial role in shape perception

**intrinsic properties**  
stable, intrinsic attributes of object: material

**extrinsic properties**  
variable, incidental attributes of scene or viewing circumstances: forces / processes



"shape scission"

Subjects can extract transformations to a certain extent

They can discount the contribution of a transformation

